



# Unconventional immune-related phenomena observed using 18F-FDG PET/CT in Hodgkin lymphoma treated with anti PD-1 monoclonal antibodies

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The paradigm of response in Hodgkin lymphoma (HL) was developed in cytotoxic chemotherapies and its use as a reference model for immune-modulatory regimens, which restores the immune system's anti-tumor capacity, is questioned [1, 2]. In a centralized review, we retrospectively analyzed 60 consecutive patients from 34 participating institutions with relapsed or refractory (R/R) HL treated with nivolumab after institutional review board approval. We observed unconventional immune-related phenomena regarding tumor response or progression, and adverse events (irAE). Transient progression in lesion size and metabolism, while the patients were continuing Nivolumab, were observed in 3.3% of patients at 3 months (A, B). Nonetheless, while pseudo-progression represents the most described immune-related pattern of response in solid tumors, along with abscopal effect and hyperprogression [3,

4], these early pseudo-progressive lesions did not significantly alter response evaluation since they were all observed in unequivocally progressive patients. The most significant encountered problems were mixed responses (B) and irAEs (A, C). Medical imaging detects 74% of irAE [5] in solid tumors, which can occur theoretically at any site and at any time. The most frequent sites reported in solid tumors are lung, mediastinal lymph nodes (sarcoidosis-like), enterocolitis, hypophysitis, thyroiditis, hepatitis, arthritis, and pancreatitis. While we identified such irAE in our cohort, we also identified imaging findings suggestive of gastritis and hemolytic anemia (A, C). In clinical routine, these immune-related phenomena should be considered as potential differential diagnoses (e.g., an increased spleen metabolism can be observed in true progression, spleen activation reflecting treatment efficacy [4], and irAE).

Laurent Dercle and Fatima-Zohra Mokrane contributed equally to this work.

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### Compliance with ethical standards

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